

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A ~~heterojunction structure~~nano-device comprising a ~~p-n heterojunction structure of a p-type semiconductor thin film and an n-type ZnO-based nanorod epitaxially grown thereon, wherein free space around portions other than tip portions of the ZnO nanorod grown on the semiconductor thin film is filled with an insulating material.~~
2. (currently amended): The ~~heterojunction structure~~nano-device of claim 1, wherein the p-type semiconductor is made of a material having a band-gap energy ranging from 1.5 to 4.5 eV.
3. (currently amended): The ~~heterojunction structure~~nano-device of claim 2, wherein p-type semiconductor is made of a material selected from the group consisting of GaN, AlN, GaP, GaAs, ZnSe, CdSe, CdS, ZnS, SrCu₂O₂, SiC and Si.
4. (currently amended): The ~~heterojunction structure~~nano-device of claim 1, wherein the p-type semiconductor thin film has a thickness ranging from 50 nm to 200 μm .
5. (currently amended): The ~~heterojunction structure~~nano-device of claim 1, wherein the ZnO-based nanorod has a diameter in the range of 5 to 100 nm and a length in the range of 5 nm to 100 μm .

6. (currently amended): The ~~heterojunction structure~~nano-device of claim 1, wherein the ZnO-based nanorod is a ZnO nanorod or a heteromaterial-doped or coated ZnO-nanorod.

7. (currently amended): The ~~heterojunction structure~~nano-device of claim 6, wherein the heteromaterial is selected from the group consisting of Mg, Mn, Cd, Se and mixtures thereof.

8. (currently amended): The ~~heterojunction structure~~nano-device of claim 6, wherein the doped heteromaterial is selected from the group consisting of $\text{Zn}_{1-x}\text{Mg}_x\text{O}$ ($0 < x < 1$), $\text{Zn}_{1-x}\text{Mn}_x\text{O}$ ($0 < x < 1$), $\text{Zn}_{1-x}\text{Cd}_x\text{O}$ ($0 < x < 1$) and $\text{Zn}_{1-x}\text{Se}_x\text{O}$ ($0 < x < 1$).

9. (currently amended): A ~~method-process~~ for preparing the ~~heterojunction structure~~nano-device of claim 1, comprising the steps of which comprises bringing the vapors of a Zn-containing metal organic compound and an O₂-containing compound as reactants separately into contact with a p-type semiconductor thin film at a temperature in the range of 400 to 700 °C under a pressure in the range of 0.1 to 10 torr to form a ZnO nanorod on the surface of the p-type semiconductor thin film, filling free space around the ZnO nanorod grown on the p-type semiconductor thin film with an insulating material, exposing tip portion of the ZnO nanorod, and forming electrodes on the surfaces of the p-type semiconductor thin film and the nanorod.

10. (canceled).

11. (currently amended): A nano-system or an integrated circuit comprising the nano-device ~~array~~ of claim ~~10~~1.

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12. (new): The process of claim 9, wherein the insulating material is a photoresist or polyimide.